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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|----------------------------|
| 09/992,410 | 11/26/2001 | Malcolm Betts | 13528-156US | 5520 |
| 7590 | 07/27/2005 | | | EXAMINER SOL, ANTHONY M |
| OGILVY RENAULT Suite 1600 1981 McGill College Avenue Montreal, QC H3A2Y3 CANADA | | | ART UNIT 2662 | PAPER NUMBER |
| DATE MAILED: 07/27/2005 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/992,410 | BETTS ET AL. | |
| | Examiner | Art Unit | |
| | Anthony Sol | 2662 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 26 November 2001.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-4, 13-24 is/are rejected.
- 7) Claim(s) 5-12 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 26 November 2001 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because line 5 states, "it is replacing by a valid payload pointer." This does not make sense. It is believed that the applicant intended to state, -- it is replaced by a valid payload pointer --. Correction is required. See MPEP § 608.01(b).

2. The disclosure is objected to because of the following informalities:

- On page 7, line 13 states, "frames are forwarded to the frame to the same shelf as the." This does not make sense. It is believed the applicant intended to state, -- frames are forwarded to the same shelf as the --.
- On page 20, line 3 states, "sub-stream 44." There is no reference number 44 in any drawing. It is believed that the applicant intended to state, -- sub-stream 28 --.

Appropriate correction is required.

Claim Objections

3. Claims 10, 18, and 23 are objected to because of the following informalities:

- Claim 10, line 3 states, "determining if a frame a lead frame of a." This does not make sense. It is believed that the applicant intended to state, -- determining if a frame is a lead frame of a --.

- Claim 18, line 3 states, "means for determining if a frame a lead frame of."

This does not make sense. It is believed that the applicant intended to state, -- means for determining if a frame is a lead frame of --.

- Claim 23, line 7 states, "and at that of at least one other sub-stream;" This does not make sense. It is believed that the applicant intended to state, -- and that of at least one other sub-stream; --.

Appropriate correction is required.

Drawings

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "28a" of Figure 2 has been used to designate both optical interface and substream. It is believed that the applicant intended optical interface to have reference character 18 as disclosed in the specification on page 11, line 24.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,693,904 B1 ("McKenzie").

Regarding claim 1 and 17,

McKenzie shows in Fig. 1, a bit-sliced switch fabric 100. Each demultiplexer 102 (Claim 17: signal processor) can receive and parallelize a different incoming signal. That is, each data stream is demultiplexed into two or more parallel streams, where each parallel stream comprises a subset of the bits of the original data stream. Each switch 104 switches the corresponding subset of each incoming signal to a different output multiplexer 106. When properly configured, all of the switches 104 are configured identically to switch the corresponding subsets of the incoming signals to the appropriate output multiplexers 106. An example of an appropriate output would be a data stream that is equivalent to the received data stream (Col. 1, lines 55-61, col. 2, lines 6-26).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2, 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKenzie in view of U.S. Patent No. 6,822,975 B1 ("Antosik").

Regarding claim 2,

McKenzie discloses a method that covers all the limitations of the parent claim.

McKenzie does not disclose that the data stream comprises an arbitrary mixture of high and low bandwidth signal traffic.

Antosik discloses that signals may have different data rates. For example, both OC3-rate and OC12-rate signals packed into a single OC48 optical signal (Col. 2, lines 5-8).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention was made to modify the data stream of McKenzie to have both high and low bandwidth traffic of Antosik in order to efficiently use the all the available data bandwidth. One skilled in the art would have been motivated to combine

McKenzie with Antosik (collectively "McKenzie-Antosik") to generate the claimed invention with a reasonable expectation of success.

9. Regarding claim 3,

McKenzie discloses a method that covers all the limitations of the parent claim.

McKenzie does not disclose that the data stream comprises any one of SONET and SDH signals.

Antosik discloses that the data stream comprises SONET-based signals (Col. 1, lines 60).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention was made to modify the data stream of McKenzie to comprise SONET signals of Antosik in order to conform to the SONET standard. One skilled in the art would have been motivated to combine McKenzie with Antosik (collectively "McKenzie-Antosik") to generate the claimed invention with a reasonable expectation of success.

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over McKenzie in view of Pub. No. US 2003/0189925 A1 ("Wellbaum").

McKenzie discloses a method that covers all the limitations of the parent claim.

McKenzie does not disclose the steps of inspecting an overhead of each

frame to determine whether the overhead contains a payload pointer and if so, storing the payload pointer.

Wellbaum shows in Fig. 9(a), that STS-1 #1 is the parent and contains the pointer, and STS-1 #2 and STS-1 #3 are children and therefore contain concatenation indicators, indicating they have a parent. It is inherent that overhead of each frame is inspected to determine whether the overhead contains a payload pointer. If an STS-1 has a concatenation indicator, RPI 814 must obtain the pointer value from the parent. In the example shown in FIG. 9(a), RPI 814 obtains the pointers for children STS-1 #2 and STS-1 #3 from parent STS-1 #1. Fig. 9 (c) shows registers with memory locations corresponding to child time slots that store data indicating their respective parent time slot (Pg. 5, paragraph 73, lines 1-4 and pg. 6, paragraph 75, lines 8-9).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention was made to include in the step of splitting the received data stream of McKenzie to comprise the steps of inspecting the overhead of the data stream for a payload pointer and storing the payload pointer of Wellbaum to be used for synchronization during recombination of the subset streams. One skilled in the art would have been motivated to combine McKenzie with Wellbaum (collectively "McKenzie-Wellbaum") to generate the claimed invention with a reasonable expectation of success.

11. Claims 13, 14, 16, 21, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKenzie in view of U.S. Patent No. 6,917,630 B1 ("Russell").

Regarding claim 13,

McKenzie discloses a method that substantially covers all the limitations of the parent claim.

McKenzie does not disclose steps of constructing a respective set of sequential frames of the output data stream and mapping payload data from the sub-stream to the output data stream. Nor does he disclose that the phase relationship between a sub-stream and the output stream is arbitrary.

Russell shows in Fig. 11 steps in constructing the output data stream. In step 1100, there are continuously generated a plurality of parallel virtual containers, which are associated together by means of virtual concatenation overhead bytes in step 1101. In step 1102, OSI layer 2 data frames are input and buffered in real time in first in first out buffer. Bytes of data from the buffered OSI layer 2 data frame are byte interleaved into a plurality of virtual containers in parallel in step 1103. In step 1104 a plurality of virtually concatenated virtual containers are output in parallel at the same time (Claim 13; Col 14, lines 7-21).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention was made to modify the construction of the output data stream of McKenzie to include the steps of inputting and buffering OSI layer 2 data frames in real time in first in first out buffer, interleaving the data frames into a plurality of virtually containers in parallel, and outputting in parallel at the same time as taught by Russell. One skilled in the art would have been motivated to combine McKenzie with Russell

(collectively "McKenzie-Russell") to generate the claimed invention with a reasonable expectation of success.

12. Regarding claims 14 and 22,

McKenzie-Russell discloses a method and system that substantially covers all the limitations of the parent claim.

In light of Russell's disclosure that virtual containers (substreams) are associated together by means of virtual concatenation overhead bytes as discussed above in claim 13, it is inherent that the phase relationship between a sub-stream and the output data stream is arbitrary (Claim 14).

13. Regarding claims 16 and 21,

McKenzie-Russell discloses a method and system that substantially covers all the limitations of the parent claim.

Russell shows in Fig. 11 steps in constructing the output data stream carried out by the transmit apparatus. In step 1100, there are continuously generated a plurality of parallel virtual containers, which are associated together by means of virtual concatenation overhead bytes in step 1101. In step 1102, OSI layer 2 data frames are input and buffered in real time in first in first out buffer. Bytes of data from the buffered OSI layer 2 data frame are byte interleaved into a plurality of virtual containers in parallel in step 1103. In step 1104 a plurality of virtually concatenated virtual containers are output in parallel at the same time (Claim 16; Col 14, lines 7-21).

14. Regarding claim 23,

McKenzie-Russell discloses a system that substantially covers all the limitations of the parent claim.

McKenzie-Russell shows in Figs 14 to 17 of Russell, a receive operation at a destination device (adjustable read pointer). A pair of VC-3 streams which have experienced differential delays over a transmission network arrive at the device at different times. Received virtual containers are fed into a memory device (alignment buffer) as they are recovered from their STM frames. As soon as an arriving virtual container is received the virtual concatenation overhead bytes of the VC payload are read to extract the stream identification data and sequence identification (synchronized) data which determine the memory location to which the VC should be written (Russell, col. 14, lines 33-43).

15. Claims 15 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKenzie in view of Russell, and in further view of Wellbaum.

McKenzie-Russell discloses a method and system that substantially covers all the limitations of the parent claim.

McKenzie-Russell discloses that the first byte of streams 800, 801 of Fig. 8 after the VC path overhead may be used to designate the virtual container stream number. Those bytes serve as a split indicator in the predetermined set of bits of the frame

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(determining whether or not the frame contains a split indicator) (Russell, col. 12, lines 22-24).

McKenzie-Russell does not disclose copying a portion of an overhead of each frame of the sub-stream to a corresponding frame of the output data stream, inserting a concatenation indicator into the overhead of the corresponding output data stream if the frame contains a split indicator, and if it doesn't contain a split indicator, examining the frame to determine whether or not the frame contains a payload pointer, and if the frame contains a payload container, inserting a valid pointer into the overhead of the corresponding frame of the output data stream.

Wellbaum discloses that PTG 1232 of Fig. 10 aligns concatenated payloads so that each outgoing SONET frame of a series of concatenated frames has the same pointer value (inserting a valid payload pointer) in the transport overhead (copying at least a portion of an overhead of each frame of the sub-stream to the output data stream)(Pg. 7, paragraph 87, lines 1-3).

Wellbaum shows in Fig. 11 a table 1310 of memory 1235 of Fig. 10. Table 1310 maps parent-child relationship for STS-1's. The table has 48 entries corresponding to 48 frames of the SONET OC-48 frame. The table includes a first submemory having concatenation indicators, CAT_IND and a second submemory storing STS identifiers, STS_ID (Pg. 6, paragraphs 84-85). Wellbaum discloses that the concatenation IDs are replaced with the pointer from the parent timeslots (Pg. 9, paragraph 117, line 4-6). If the frame contains a split indicator as shown Russell above, the concatenation indicator

can be inserted into the overhead of the corresponding frame of the output data stream by reverse mapping the procedure above in table 1310.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention was made to include in the steps of constructing sequential frames of output serial data stream and checking for the presence of a split indicator as taught by McKenzie-Russell, the steps of aligning concatenated payloads so that outgoing SONET frame has the same (valid) pointer value in the transport overhead, inserting a concatenation indicator as taught by Wellbaum. One skilled in the art would have been motivated to combine McKenzie-Russell with Wellbaum (collectively "McKenzie-Russell-Wellbaum") to generate the claimed invention with a reasonable expectation of success.

16. Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKenzie in view of Antosik.

Regarding claim 18,

McKenzie discloses a system that substantially covers all the limitations of the parent claim.

McKenzie discloses that the sliced architectures is not limited to bit sliced architecture. Other types of sliced architecture are possible such as byte-sliced architectures. It follows then that frame-sliced architectures are possible. Therefore, every m^{th} frame is a lead frame (Col. 1, lines 50-61).

McKenzie does not disclose that the means for modifying a lead

frame that contains a concatenation indicator to emulate a lead frame of a SONET/SDH concatenation.

Antosik discloses that the data stream comprises SONET-based signals (Col. 1, lines 60).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention was made to modify the lead frame of McKenzie to emulate the data stream comprising SONET-based signals as taught by Antosik so that the outputted data stream will be efficiently processed by the terminating equipment using SONET protocol. One skilled in the art would have been motivated to combine McKenzie with Antosik (collectively "McKenzie-Antosik") to generate the claimed invention with a reasonable expectation of success.

17. Regarding claim 20,

McKenzie-Antosik discloses a system that substantially covers all the limitations of the parent claim.

McKenzie-Antosik teaches that every m^{th} frame is the lead frame and will be transmitted to the next successive shelf. It is inherent then that any other frames are forwarded to the same shelf as the previous frame (McKenzie, col. 2, lines 6-9).

18. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over McKenzie in view of Antosik, and in further view of Wellbaum.

McKenzie-Antosik discloses a system that substantially covers all the limitations

of the parent claim.

McKenzie-Antosik discloses that the first byte of streams 800, 801 of Fig. 8 after the VC path overhead may be used to designate the virtual container stream number. Those bytes serve as a split indicator in the predetermined set of bits of the frame (Russell, col. 12, lines 22-24).

McKenzie-Antosik does not disclose replacing the concatenation indicator with a valid payload pointer.

Wellbaum shows in Fig. 11 a table 1310 of memory 1235 of Fig. 10. Table 1310 maps parent-child relationship for STS-1's. The table has 48 entries corresponding to 48 frames of the SONET OC-48 frame. The table includes a first submemory having concatenation indicators, CAT_IND and a second submemory storing STS identifiers, STS_ID (Pg. 6, paragraphs 84-85). Wellbaum discloses that the concatenation IDs are replaced with the pointer from the parent timeslots (Pg. 9, paragraph 117, line 4-6).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention was made to modify the lead frame of McKenzie-Antosik to include a means for replacing the concatenation Ids with a valid pointer as taught by Wellbaum. One skilled in the art would have been motivated to combine McKenzie-Antosik with Wellbaum (collectively "McKenzie-Antosik-Wellbaum") to generate the claimed invention with a reasonable expectation of success.

Allowable Subject Matter

19. Claims 5-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 5 is allowable because the prior art of record does not teach or fairly suggest wherein the step of splitting the received data stream comprises a step of assigning a default value to a predetermined set of one or more bits of each frame.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Sol whose telephone number is (571) 272-5949. The examiner can normally be reached on M-F 7:30am - 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (571) 272-3088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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7/14/2005

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